itself; and I was soberly informed by a resident of the city that the greater number of the shocks at that time were occasioned by explosions of dynamite in the neighborhood. The desire to ignore the earthquake danger has not altogether prevented the legitimate influence of the catastrophe on building regulations and building practises, but there can be little question that it has encouraged unwise construction, not only in San Francisco but in other parts of the malloseismic district.

The policy of concealment is vain, because it does not conceal. It reflects a standard of commercial morality which is being rapidly superseded, for the successful salesman to-day is he who represents his goods fairly and frankly. It is unprofitable, because it interferes with measures of protection against a danger which is real and important.

IS THIS ONE NATURAL METHOD OF MAKING SNOW?

Mr. W. W. Neifert, Local Forecaster at Hartford, Conn., recently sent the Editor the following clipping from the New England Palladium for February 6, 1810.

Springfield, Mass.
January 15, 1810.

A very singular appearance was exhibited in this town on Friday last. The Thermometor standing at 0, and two degrees above, with the wind very high at North West. The river furnished an appearance of a heavy fog passing rapidly down it. On an appearance so extraordinary examination was made, and it was found that the wind took the small particles of water and carried them up into the atmosphere, where they immediately congealed into fine snow; they arose some as much as 40 feet above the surface of the water. Its commencement was about meridian, and continued through the day, but most conspicuous at 2 P. M. Several very aged people living in this vicinity do not remember ever seeing the like appearance.

WEATHER BUREAU MEN AS EDUCATORS.

J. W. Bauer, Section Director, Columbia, S. C., reports that the faculty and trustees of the University of South Carolina have just added an elective course in "Elementary and Practical Meteorology" to the curriculum of that institution. The course will begin about February 16, and will consist of 15 weekly lectures by the official in charge of the local office. Waldo's Elementary Meteorology will be used as a text. The class is expected to number about 15 students.

M. E. Blystone, Local Forecaster, Providence, R. I., reports that on January 4 he addrest the Men's Club of the Congregational Church, Seekonk, Mass., on "Weather Forecasts;" repeated this address on the 28th before the Men's Club of St. James Episcopal Church, Providence.

W. D. Fuller, Observer, reports that classes from the Pasadena and South Pasadena High Schools visited the Los Angeles, Cal., office on February 17 and 18; and from Throop Polytechnic Institute on the 23d. These classes visit the office regularly every year.

Eric R. Miller, Local Forecaster, Madison, Wis., reports that on February 26 he began a course in climatology at the University of Wisconsin. The class meets three times weekly for lectures, recitations, and practical exercises, using Hann-Ward's Climatology as a text. The enrolment is 1 student from the School of Agriculture, 2 from Engineering, 3 from Letters and Science, and 6 from Commerce.

E. H. Nimmo, Observer, Sandusky, Ohio, reports that a class from the Sandusky High School visited the local office on February 18, 1909.

G. H. Noyes, Local Forecaster, Lexington, Ky., addrest the Men's Club of the Second Presbyterian Church of that city on February 1, 1909. His subject was "The daily workings of the Weather Bureau."

H. W. Richardson, Local Forecaster, Duluth, Minn., reports that on February 10 he gave an illustrated talk before the Park Point Improvement Club on "The Weather Bureau."

J. Warren Smith, Section Director, Columbus, Ohio, reports that classes from the Central High School visited the local office on February 10 and 11.

Wilford M. Wilson, Section Director, Ithaca, N. Y., reports that during February he gave illustrated lectures on topics pertaining to the work of the Weather Bureau before the Cornell Agricultural Association, the Political Study Club, Short Course Students' Association, Forest City Grange, Town and Gown Club, Ithaca Business Men's Association; also two lectures at the College of Agriculture during Farmers' Week.

M. L. Fuller, Observer, Canton, N. Y., reports that on January 26, he delivered a lecture on "The practical value of the Weather Bureau" before the "Farmers' Week" assemblage at Canton, N. Y. After the lecture a considerable portion of the audience visited and inspected the local office in the Carnegie Science Building, St. Lawrence University.

INFLUENCE OF MOUNTAINS AND COASTS ON STORMS.

By D. T. SMITH, M. D. Dated Louisville, Ky., March 1, 1909.

In the December number of the MONTHLY WEATHER REVIEW the Editor remarks that "It is very desirable that some one should explain in detail the mechanism by which a given range of mountains or the coast of a continent deflects the path of a hurricane center. The east–west ranges in the West Indian Islands and the northeast-southwest Appalachian Range appear to have appreciable influence on some storms, but not on others."

For more than twenty years the writer has been trying to attain the result suggested by the development of a theory that has grown with the development of facts.

The MONTHLY WEATHER REVIEW of June, 1906, 34:280, published this theory of mine which is that cyclones and hurricanes, which seem to be nothing else than cyclones moving under the more favorable conditions of tropical seas, derive their movement of translation from the necessity of the coincidence of their center of gravity and their axis of rotation.

At the request of Dr. Hugh Robert Mill, editor of Symons's Meteorological Magazine, this theory was set forth more elaborately in the issue of that journal for May, 1908.

The contention is that the upper constant currents blowing toward the west, in the Tropics, then circling around to become the constant westerlies of the temperate and polar regions, are continually beheading the cyclone, thereby creating a partial vacuum, and that the pressure of the surrounding air into this is the chief source of all cyclonic energy.

The cyclone measurably yields to these currents and leans over in the direction of their motion. The air rushing in from all sides fills up the space in front under the leaning body faster than the rear can be added to, and this shifts the center of gravity forward. Since the mass of the cyclone or hurricane is rotating, the axis must move forward continuously to correspond with the center of gravity, and thus the cyclone is kept constantly advancing. If a mountain chain lies across the cyclone path it will prevent the increase of diameter in front, and thus hold the center of gravity and axis, for a time, stationary. Or it may happen that the mountain chain will hold back the inrush of air in front until that already present is sucked up into the cyclone, thus moving back the center of gravity, and as a result the center of the cyclone will actually recede for a time and has been known to do so.

After a time the cyclone begins to be added to in front above the level of the mountains. This moves the center of gravity forward and the cyclone proceeds to cross the range.

A mountain range running in the direction of travel of a cyclone would deflect the path of a cyclone away from itself in proportion as the diameter of the cyclone's base was interfered with.

If the level of outflow in a cyclone should happen to be unusually high, it would not need to halt at an ordinary mountain chain, and it would be less affected by such a chain parallel with its path.

Continents affect cyclones variously, or rather the frictional resistance of continents must meet a variety of conditions. Tropical cyclones (and I much doubt if there are any other

kind) beaten back by the trade winds would probably never get poleward of the Tropics if it were not for the arrest of these winds by continental friction. This friction often becomes effective some distance to the eastward over the ocean by damming back the trades. It thus happens that cyclones are often carried poleward by the antitrades [prevailing westerlies?], and started on their eastward journey while still some distance out at sea, as on the coast of Florida, Australia, etc.

BAROMETRIC PRESSURE AND EARTH PULSATION.[1]

By N. Shimono, Japan.

According to Professor Omori pulsation of the earth is due to changes in the pressure upon the earth's crust and these are mostly caused by barometric depressions, or by changes in sea-level when the latter occurs, but not to the wind itself. The following is the result of our investigations into the relation between barometric depressions and the earth's pulsation as observed in the vicinity of Osaka. On the morning of the 4th of August, 1908, a barometric depression made its appearance at sea far to the south of Ishigakijima, and it past between Okinawajima and Emi-Oshima at 6 a. m. of the 6th with the barometer showing a pressure of 735 millimeters. The center of the depression then moved northeastward and approached the southern coast of Kii at 6 a. m. of the 7th. Thence it moved toward Nagoya and past thru Honshu entering the Japan Sea. According to the Omori seismograph at Osaka Observatory, the pulsatory oscillations became more frequent as the depression approached and were recorded in in the greatest numbers on the evening of the 7th, the amplitude of the east–west component being 0.06 millimeter, and that of the south–north component 0.07 millimeter. As the depression past away northeastward the pulsatory oscillations gradually decreased.

The barometric depression of July 22–28, 1906, which past over the southern and southeastern coasts of Japan, the depression of December 20–24, 1907, which past eastward over the Japan Sea, and the barometric depression of August 22–28, 1908, which moved from the eastern China Sea across the Yellow Sea and then toward Siberia, not only confirm the above statement but also prove that when there is a strong barometric gradient the number of pulsatory oscillations of the earth's crust is greatly increased.

We next made some study of the relation between the wind and the pulsatory oscillations, but we could hardly find any such relation.

RESEARCHES ON THE SOLAR CONSTANT AND THE TEMPERATURE OF THE SUN.

By Dr. J. SCHEINER, Potsdam, Berlin.

[Extract from Monthly Notices, Royal Astronomical Society, 1908, 68:662.]

The measurements of the sun's radiation were made with the Ångström electric compensation pyrheliometer, to which I had given a modified exterior form and a parallactic motion with clockwork. On eleven days in June and July, 1903, I made a long series of observations on the summit of the Görner Grat, Canton Wallis, Switzerland, from which I could derive the radiation of the sun outside our atmosphere. This part of the problem is the most difficult one, and according to my view it can not be solved from measurements of the solar radiation alone. From such observations a portion only of the real solar constant can be obtained, because only that portion of the loss by absorption in our atmosphere can be calculated which is based upon the *continuous* increase of absorption with growing thickness of the atmosphere traversed by the radiation. With carbon dioxide and water vapor there exists a nearly sudden absorption in the highest thin layers of the atmosphere, which must be treated as a constant to be added to the radiation-curves. Therefore this latter result is not the solar constant as generally supposed, and I have chosen for it the term "Strahlungs-konstante" or "constant of radiation."

From my observations on the Görner Grat it amounts to 1.95–2.02 gram-calories. The remaining constant, which must be added to it in order to obtain the solar constant, can be found only from experimental researches in the laboratory. To this part of the problem I have devoted much labor in measuring the absorption of carbon dioxide and superheated water vapor with varying depth of layer.

This very complicated research can not be described in a short abstract, and I must therefore refer the reader to the original paper. The result is that to reduce the "constant of radiation" to the solar constant there must be added for carbon dioxide 1 per cent, for water vapor 7 per cent, and for the ultraviolet absorption 1.5 per cent, whence the solar constant for the unit of distance is found to be 2.22–2.29 gram-calories, with a probable error of 2 per cent.

THE BLANKET EFFECT OF CLOUDS.

By Dr. W. W. COBLENTZ, Ph. D. Dated Washington, D. C., February 12, 1909.

In the various discussions of meteorological and geological phenomena, the "greenhouse" and "blanket" effect of clouds in conserving terrestrial temperature seems to have been pushed to the limit without considering the functions that clouds can perform.

First of all, water is the most opaque substance known for infra-red radiation, but it is very transparent for light waves. It belongs to the class of substances known as "insulators" or "transparent media," in which the reflecting power is a function of only the refractive index, the absorption coefficient (altho high for water as compared with other transparent media) being still too low to affect the reflecting power. This means that since the refractive index of water is low, the reflecting power is low. Indeed water is unique in this respect, for it has no marked bands of metallic reflection such as obtain in quartz, glass, and various other minerals. The reflecting power of a plane surface of water is less than 8 per cent thruout the spectrum to 20μ, and in the regions where there are no absorption bands the reflecting power is much less, even as low as 2 per cent.

Let us now consider what must be the behavior of water in the form of clouds. The albedo of clouds for sunlight is more than 60 per cent. The value of the refractive index shows that the reflecting power can not be much above 2 per cent, and the high value of 60 per cent must occur as a result of scattering at the surface of the water globule and of internal reflection.

In the infra-red there can be but little internal reflection due to the great opacity of the water globule for heat waves. Hence the reflecting power must remain low, and of the same magnitude as that of a plane surface, viz, from 2 to 5 per cent. If water had bands of strong selective reflection in the infra-red the albedo of clouds might be higher than the above estimates.

The "blanket" effects of clouds must therefore be due principally to their high emissivity (for those radiations emitted by the earth) hence to their high efficiency as a heat radiator. By definition the Kirchhoff radiator (so-called "black body") is one in which the reflecting power is *nil* and which is perfectly opaque. Water fulfills this first condition to within 2 to 5 per cent (depending upon the wave-length) and the second condition to such an extent that a layer 1 cm. thick absorbs completely all radiation of wave-length greater than 1.5μ in the infra-red. In the region of 8μ, where lies the earth's maximum emission, less than 1 mm. thickness of water is required to produce complete opacity. The "blanket"

[1] Abstract in English, reprinted from Journal Meteorological Society, Japan, September, 1908, 27th year, No. 9, p. 25–6.